SUSPECT/ COUNTERFEIT ITEMS

Identified at DOE Facilities

November 1997

DISCLAIMER

This booklet provides information on individual components identified as suspect or counterfeit. Without additional information, the manufacturers or suppliers identified should not be considered to have engaged in any wrongdoing . It is not necessarily a negative reflection on a supplier or manufacturer if their products are reported as Suspect/Counterfeit Items (S/CIs). Reputable manufacturers and suppliers have a vital interest in preventing the manufacture and distribution of S/CIs associated with their names. The supplier or manufacturer may have been victimized and is pursuing S/CIs associated with its products in an aggressive, prudent, and professional manner to get them off the market. Therefore, each particular case must be examined on its own merit without making premature conclusions about the fault or culpability of the manufacturer or supplier whose name is associated with the S/CI.

ACKNOWLEDGMENT

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FOREWORD

This booklet was developed with the goal of providing a handy reference to those at DOE facilities charged with identifying suspect/counterfeit items (S/CI) and arranging for their disposition. It includes pictures of actual counterfeit items found across the DOE complex, and descriptions of the features that identify them. Each item pictured was received as a new part at one or more DOE facilities. Questions about their fitness for use were typically raised by maintenance personnel during the installation process.

This booklet is not intended to be an all-inclusive treatment of the S/CI issue. Extensive information on S/CIs has been distributed to DOE contractors through various channels of DOE's infrastructure.

This booklet was created using Aldus Page Maker. It can be downloaded as a pdf file, from the DOE FM Suspect/Counterfeit Items Home Page (http://www.fm.doe.gov/SCI/). The booklet can be printed from the pdf file, however a high resolution printer (600 dpi or better) is recommended.

All those who use this material are encouraged to add to this work. By contributing pictures and descriptions of newly discovered S/CIs this booklet will become a "living" document providing continuing value to its many users. Please contact one of the following regarding contributions and suggestions for improvement.

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e-mail: DENIS.FECK@hq.doe.gov

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Valves	Kerotest	8" Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp.& Attach
	Pacific	4" Gate Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp. & Attach.
	Lunkenheimer	6" Model 1542 20" Model 3013	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp. & Attach.
	Crane	All	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp. & Attach.
Valve Actuator	Limitorque	Eyebolts on housing cover	None Listed	Office of Nuc. Safety 93-25 NRC I.N. 93-37
Valve Replacement Parts	Masoneilian-Dresser Industries	Plug stem, stem to plug anti-rotation pin, seat ring, valve plugs, bushings, cages & packing box components	Cor-Val, Control Valve Specialists, H.H. Barnum & M.D. Norwood	NRC I.N. 88-97 Supp. & Attach.

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Switches	(Component Examples)			
	Crouse Hinds #EDSC2129 Sq. D Type G, Class 9012, 9025, 9016	Tumbler, ft. op.	Platt Electric Supply Co. Gen. Motors, Electro-Motive Design	SENS ID #16 1-27-92 Office of Nuc. Safety 93-24 & 93-27
Transmitters	Rosemount	(Component Examples) •Model 1151 GP •Model 1151 DP	Venetech	INEL Letter E.L. Wilmot dated 8-1-91 H. Richardson HR-81-91, dated 8-15-91
Valves	VOGT	Full port design 2-inch Model SW-13111 & 1023	CMA International IMA Valve Refurbisher	NRC I.N. 88-48 & Supplements
	Crane	4"-1500 psi, pressure sealed	Southern Cal. Valve Maintenance Co., Amesse Welding Service & CMA Int.	NRC I.N. 91-09
	ITT Grinnell Valve Co., Inc.	Diaphragm valves	ITT Grinnell Valve Co. Inc., Div. of Diaflo & ITT Engineered Valves	NRC Comp. Bulletin 87-02
	Crane, Pacific, Powell, Walworth & Lunkenheimer	Gate Valves	Coffeyville Valve Inc.	NRC I.N. 92-56
	Pacific	8" & 3" Globe Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48, Supp. & Attach.
	Crane Chapman	24" Check Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp. & Attach.
	Pacific	Check Valve	CMA & IMA Valve Refurbisher	NRC I.N. 88-48 Supp.& Attach.

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COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Starter Controls	Westinghouse (Component Examples) •A200MICAC •A201KICA •A201K2Ca •AN13A	Not Provided	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-48
Starters	Westinghouse (Component Examples)	Not Provided	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46 Supp. & Attach.
Steel	Alloy & Carbon Steel Co. Inc., Atlantic Steel Co., Levingston Steel Co., & Copperweld Steel Co.	Plate Angle Flat Bar Bar	Meridith Corporation Pressure Vessel Nuclear Alloy & Carbon Steel Co., Inc.	NRC I.N. 89-56, Attachments and Supplements

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
	Amerace (or Agastat) (Component Examples)			SENS ID #1 11-1-91 NRC I.N. 92-24
	Models: E7024 E7022	Electro Pneumatic Timing Relays	Amerace	
	A through L Series Model 7032	PRB	Control Components Supply	
Relay, Overload Thermal Unit	Square D (Component Examples) B19.5, B22	Not Provided	Not Provided	NRC I.N. 88-46
Resistors	Unknown	All	Impala Electronics	NRC I.N. 91-01
Semiconductors	Solid State Devices Inc. (SSDI)		SSDI	DOE Albuquerque Letter, 06-25-96 to DOD Inspector General
	SFF 9140	P-Channel MOSFET		
	SPD 1511-1-11	Pin Diode (SA3059)		
	2A14/18 or 2A14/52	Ion Implanted Diode		
	SSR4045CTTXV	SCHOTTKY Diodes		
	SFF9140TWX	Power Transistors		
	SPMF106ANH	Special Pack MOSFET Switch		
	SPD 5818 or IN5858JTXV	Axial Leaded SCHOTTKY Diode		
	2N797	Transistor		
	Unknown	Diode (SA3436)		

Introduction

Suspect/Counterfeit Items (S/CIs) have been a concern across the DOE complex since the early 1980s. These concerns initially focussed on fasteners. However, as this booklet shows, S/CIs can include many other items.

Many DOE facilities have instituted controls to address this problem. Through the use of the "Graded Approach", the extent of these controls focuses on the potential ES&H impact of S/CI failure. The controls include proper component designations in design documentation, addition of appropriate clauses in procurement documents, review/inspection of received material, review of installed equipment, review of material in stores, and training of the personnel involved.

Suspect/Counterfeit Items Courses

It is important that all personnel involved in specifying, ordering, inspecting, and maintaining items and equipment be trained in recognizing S/CIs. Many facilities have taken advantage of the S/CI training available from The Quality Training and Resource Center (QTRC), which is endorsed by DOE. The training they provide includes hands-on instruction and covers the following aspects:

Suspect/Counterfeit Items - gives a general awareness of S/CIs, their identification, actions to take, and reporting requirements.

S/CI Design and Specification Prevention Tools - covers the writing of clearer specifications to help prevent the purchase and introduction of S/CIs into the workplace.

S/CI Procurement Prevention Tools - provides guidance on weaknesses in the procurement process that might allow acquisition of S/CIs. Actions to strengthen procurement practices are discussed.

S/CI in Cranes - covers actions to take in addressing S/CIs in cranes and lifting devices. Special attention is given to the "critical load path" of this type of equipment.

For further information contact:

The Quality Training and Resource Center
P.O. Box 1970
Richland, Washington 99352
(509) 376-7117.

e-mail: Roger_D_Moerman@RL.gov

SUSPECT ITEM INDICATOR LIST

Components with the following indications are considered suspect, unless otherwise noted.

I. **PIPING AND PIPING COMPONENTS (Including Mechanical and Metal Products)**

A. General Indications:

- Used appearance of component
- Unusual or inadequate packaging
- Foreign newspapers used as packaging
- Scratches on component's outer surface
- Evidence of tampering on body, screws, tags, or nameplate
- Components with no markings
- Pitting or corrosion
- External weld or heat indications
- Questionable or meaningless numbers
- Typed labels
- Evidence of hand-made parts
- Painted stainless steel, freshly painted parts, mismatched colors
- Ferrous metals that are clean and bright
- Excess wire brushing or painting
- Ground-off casting marks with stamped marks in the vicinity
- Signs of weld repairs
- Threads showing evidence of wear or dressing
- Inconsistency between labels
- Old or worn nameplates
- Nameplates that look newer than the component
- Missing manufacturer's standard markings and logos
- Traces of Prussian Blue
- Markings not legible
- Evidence of re-stamping
- No specification number
- No size designation
- Missing pressure class rating
- Other missing designations per the specification

B. General Valve Indications:

- Wrench marks on valve packing glands, nuts, and bolts
- Nameplates attached with screws rather than rivets
- Poor fit between assembled valve parts
- Internals dirty or show signs of rework (eg., lapping compound, Prussian Blue)
- Scratched or marred fasteners or packing glands
- Gate valve: gate off-center when viewed through open end
- Fresh sand-blasted appearance of valve bodies, eye bolts, fittings, stems

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Piping, Fittings, Flanges, and Components	Tube-line Corp. Ray Miller Inc.	Subassemblies, fittings, flanges & other components (Carbon and Stainless Steel components)	Tube-line Ray Miller Inc.	NRC IEB 83-06 NRC I.N. 89-18 NRC IEB 83-07 NRC I.N. 83-01
	Piping Supplies, Inc. & West Jersey Mfg. & Chews Landing Metal Mfg.	Carbon and Stainless Steel Fittings and Flanges	Piping Supplies, Inc. & West Jersey Mfg. & Chews Landing Metal Mfg	NRC Bulletin 88-05 & Supplements
Pumps & Replacement Parts	Hayward Tyler Pump Co.	HTPC ASME Nuclear Code	Hayward Tyler Pump Co.	IEB 83-05 &Attach-ments
Pushbutton Station	Crouse Hinds (Component Examples) #00-737-637-118	Single gang, push button	Platt Electric Supply Co.	SENS Report ID #16 1-27-92
Relays	Potter & Brumfield (Component Examples) MDR-138-8, 173-1, 134-1, 142-1	Non-latching rotary	Stokely Enterprises	NRC I.N. 90-57 & Attach.
	Teledyne	All qualified to MIL-R-28776 and MIL-R-39016	Not Provided	DOE-ID Wilmot letter 7-16-91
	G.E. & Exide (Component Examples) •12HGA-11S52 •NX 400	Overload & Aux	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON Interna-tional (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supp. & Attach.
	Manufacturer not provided •FSC-5945	Not Provided	Stokely Enterprises	DOE Letter 8-26-91 Reprinted "NuVEP: Bulletin 7-26-91

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Gauge Glasses	Siemen & Allis (Component Examples) #00-737-637-118 215 T	Not Provided	Rosen Electric Co.	NRC I.N. 88-46 Supp. & Attach.
Mercury Lamps	Spectro Inc. (Component Examples) V00014	Not Provided	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCONInternational (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46
Motors	Siemen & Allis (Component Examples) INP 143 T 215 T	10 H.P.	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supplements and Attachments

- Foreign material in valve (metal shavings)
- Loose or missing fasteners,nameplate, manufacturers logo
- Different types of handwheels on valves of the same manufacturer
- Some parts (e.g., handwheels) look newer than the rest of the valve
- Improper material (e.g., bronze nut on a stainless stem)
- Post manufacturing alterations to identification/rating markings

C. **Specific Valve Indications:** Valves produced by the following manufacturers generally have the following features and are considered suspect if these features are missing.

Crane Valves:

- Body Cast or Forged Markings:
  - Crane name
  - Pressure rating
  - Pattern number
- **Nameplate Information:**
  - Made from stainless steel (silver color) with black lettering
  - Attached by drive screws OR attached on valve stem underneath handle
  - Valve size
  - Pressure class, operating pressure at temperature
  - Body material
  - Seat material on valve body and valve seat
  - Stem-trim material and heat-treat conditions
  - Certification data
  - Military specification, if applicable
  - Drawing number
  - Shop Order Number (SO#)

Powell Valves (Wm. Powell Co.):

- Body Cast or Forged Markings including the name “Powell”
- Valve class
- Valve size
- Grade of steel
- Melt number
- Nameplate Information:
  - Riveted to valve body OR attached to valve stem underneath handle
  - Attached with single end welded wire (small valves)
  - Serial number
  - Valve size
  - Figure number
  - Body style
  - Valve stem, disc, and seat type
  - Strength at temperature
  - Strength at 100° F
  - “The Wm. Powell Co. Cin., OH. Made in U.S.A.”

Vogt, Henry Machine Co., Inc.:

- Body Cast or Forged Markings:
  - The name “Vogt”
  - Pressure rating
  - Pattern number
  - Size
  - Material Specification
  - Two code ID - 3 letter code and a 4 digit code (For example: ABC and R-1421)
- Nameplate Information:
  - Made from aluminum with electro-chemical etched lettering
  - Attached on valve stem underneath handle
  - Valve size
  - Pressure class, operating pressure at temperature
  - Body material
  - Internal seat material or internal H.F.
  - Stem trim-material
  - Specification number
  - Drawing number
  - Pressure rating

Walworth Valves:

- Body Cast or Forged Markings:
  - The name “Walworth”
  - Pressure class
  - Size
  - Heat code
  - Serial number (stamped)
- Nameplate Information:
  - Made from aluminum
  - Attached by drive screws
  - Attached to cover at times
  - Valve size
  - Pressure class and operating pressure at temperature
  - Body material
  - Internal seat material or H.F.
  - Stem trim-material and heat-treat conditions
  - Figure number
  - Serial number
  - Location of manufacture
  - Item code number

Masoneilian - Dresser Valves:

- Masoneilian or Worthington Controls stamped on nameplate
- MN or Masoneilian on valve body

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Fasteners (Bolts, Screws, Nuts, and Washers)	NUCOR	1-1/4" X 2" Zinc Chromate plated surface Hexhead cap screws	Cordova Bolt Inc.	SENS ID#13 11-6-91
	Any	Any	Aircom Barnett Bolt Works Bolts & Nuts, Inc. Glasser & Assoc. Knoxville Bolt & Screw Metal Fastener Supply Phoell Mfg. Co. Service Supply Co. Southeastern Bolt & Screw Sure Loc Victory Bolt	NRC Compliance Bulletin 87-02 NRCI.N. 89-59
Fire Barriers	Thermal Science Inc.	Thermo-Lag 330	None Listed	ES&Q Update #18 NRC I.N. 92-55
Flanges	China Ding Zinang Nan Xi Li Flange Co. Shou Gang Mach. Eng. Co.	Flanges, ASTM A105, ASME SA105	Billiongold Co. LTD. Tain Gong Co. Shanxi Province Overseas Trading Corp.	NRC I.N. 92-68 and Attachments Office of Nuclear Safety 92-25, 93-23, and 92-35
Fuses	Bussman Co. (Component Examples)	15A-250V & 30A-600V	General Circuit Breaker & Electrical Supply	NRC I.N. 88-46, Supp. & Attach.
	REN 15 & NOS-30		HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	
	Class 1E	All Supplied by PMS	Preventive Maintenance Systems (PMS)	NRC I.N. 88-19

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Electrical Frames (cont'd)	Westinghouse (Cont'd)		ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	
Fasteners (Bolts, Screws, Nuts, and Washers)	{parentheses designated head mark}	• Those with suspect suppliers or manufacturers	Note: Listed suppliers may also be manufacturers.	Commercial Carrier Journal Articles for: 6/88, 1/90, 2/90, 3/90, 4/90, 6/90, 7/90, 12/90
	Asahi (A) Daiichi (D) Daiei (E) Fastener Co. of Japan (FM) Hinomoto Metal (H) Jin Her (J) Kyowa (K) Kosaka Kogyo (KS)	• Those that are improperly marked • Those of foreign manufacture that do no meet Public Law 101-592, The Fastener Quality Act.	Lawrence Engineering & Supply Co. Metal Building Bolts Nichimin Corp. UNICO Ace Corp. E. K. Fasteners, Inc. H.Y. Port Fasteners Co.	INEL Suspect Headmark List SENS Report#5 2/6/91
	Kyoei (KY)		Kobayashi Metals, LTD. Takai Screw Mfg. Co. LTD.	SENS Report #13, 11/6/91
	Minamida Seiybo (M) Mnato Kogyo (MS) Nippon (NF) Takai (RT) Tsukimori (S)		Yamaguchi Sesakusho Co. LTD. Highland Bolt & Nut Porteous Fastener Co.	 HR 3000, US House of Representitives, 7/1988
	Unytte (UNY) Yamadai (Y)		Northwest Fasteners Ziegler Bolts & Parts Co.	 INEL Letter J.A. Jones, 9/23/92
	Ivaco, Infasco(hollow triangle)		Edgewater Fasteners, Inc. Reynolds Fasteners A&G Engineering	 INEL Memo from L. Kubicek 3/28.91 INEL Memo from D. Sanow 3/8/91 *Fastener Technology International,* Feb., April, and June 1993 Rep. J. Dingell Ltr to Comm. Dept. & NRC, June 18, 1993 Office of Nuc. Safety 93-26, 93-22, 93-11

II. ELECTRICAL COMPONENTS Components with the following indications are considered suspect.

A. General Indications:

- Screwdriver marks on terminals
- Different screw types or materials on terminals
- Handwritten or typed rather than stamped tags
- Missing, incorrect, or altered label/tag (usually UL)
- Pitted or worn contacts and lugs
- Not in manufacturer's box or container
- Signs of paint or smoke
- Insufficient nameplate information
- Missing terminals
- Screws used in place of rivets
- Body worn or discolored
- Rough metal edges
- Scratched or marred surfaces
- Metal color inconsistencies
- Modified or re-stamped nameplates
- Improper fastening of nameplates
- Plastic parts of different colors
- Discolored or faded manufacturer's labels
- Past due calibration stickers (internal and external)
- Broken or damaged solder terminations
- Broken, damaged, or incorrect connection lugs
- Contacting surfaces that do not mate properly
- Lubrication that appears old
- Electrical leads of incorrect length, per OEM literature

B. Specific Indications:

Molded-Case Circuit Breakers:

- Handle modified to change Ampere rating
- Style is no longer manufactured
- Unusual packaging: bulk packaging, generic packages, and "cheap" appearance
- Refurbisher's name on breaker
- Broken seal between halves, screw sealing material upset/missing
- Case held together with incorrect fasteners, eg. rivets replaced with screws/bolts
- Missing date code on body
- Contradicting amperage ratings

Fuses:

- Label missing or weathered
- Wear marks on bases

Power (Draw Out) Circuit Breakers:

- Different color or shape of overcurrent devices
- Suspicious looking auxiliary trip devices

Motor Starters:
- Poor fitting or wrong voltage-rated operating coil

Motor Control Centers:
- Breakers that are not easily opened or closed when compartment door is closed
- Exposed busswork with compartment doors open

Electro-mechanical Relays:
- Poor or loose fitting relays

Potter-Brumfield Relay:
- Sloppy coil lead-solder joints
- Painted relay base grommets (normally clear)
- Terminal strips fastened with eyelets
- Painted rivets fastening the terminal strip to the relay housing
- Termination screws in brown paper bags (should be in clear, heat-sealed plastic bags)
- Use of bubble wrap (plastic with styrofoam should be used)
- Repainted inner bell surface
- Missing or inconsistent date codes, inspection stamp, and test stamp
- Incorrect shaft-relay cover clearance, shaft play, and lack of bearing lubricant
- Tops of rotor shafts painted a color other than black
- Nonuniform numbers stamped on the contact decks, indicating decks made up from various relays.
- Incorrect coil (i.e., 125 VDC relay with 200 VDC coil)

III. FASTENERS

A. General Indications:
- No manufacturer's or grade mark (unless certified to a specification not requiring marking)
- Evidence of machining marks
- Poor thread form, evidence of wear, evidence of dressing
- Head marks shown on the Suspect Fastener Head Mark List
- Foreign manufacturer not meeting Public Law 101-592
- No markings for nuts or washers packaged with labels indicating that they were manufactured to a code or MIL-SPEC which requires marking
- Head markings are marred, missing, or appear to have been altered
- Head markings are inconsistent with a heat/lot
- Double stamping

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Circuit Breakers	Cutler Hammer (Cont'd) (Component Examples)		PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	
Circuit Breakers	Manufacturer Not Provided (Component Examples) 50DHP250	2 pole - 50 amp.	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supp. & Attach.
Controllers	Manufacturer Not Listed (Component Examples) FSC 6110	Motor Controllers	Stokely Distributors & Stokely Enterprises Inc.	DOE letter 8-26-91 & NUVEP Bulletin 7-26-91
Electrical Frames	Westinghouse (Component Examples) KB3250F	Not Provided	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale	NRC I.N. 88-46

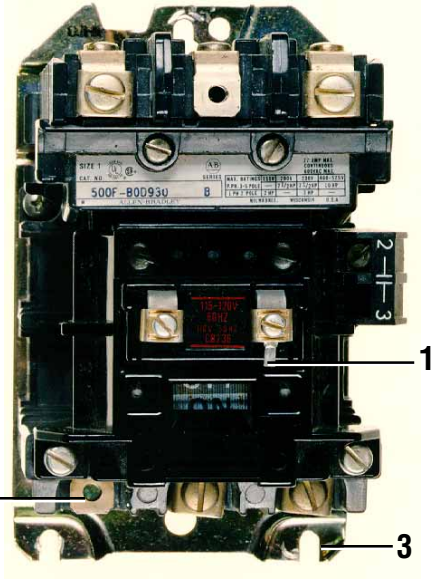
COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Circuit Breakers	Jefferson (Component Examples)	Not Provided	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supp. & Attach.
Circuit Breakers	Superior (Component Examples) •246U-3	Not Provided	General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88-46, Supp. & Attach.
	Cutler Hammer (Component Examples) •10177H13 •10177H21 •10177H32 •10177H1036 •10177H1049	Not Provided	General Circuit Breaker & Electrical Supply HLC Electrical Supply, California Breakers, Inc.	NRC I.N. 88-46, Supp. & Attach.

IV. DOCUMENTATION AND CERTIFICATION:

A. General Indications:

- Use of correction fluid or correction tape
- Change evident in font/type style or pitch
- Documentation has missing (or illegible) signature, initial, or data
- Document is excessively faded, unclear, or photocopied
- Inconsistent technical data
- Certification or test results are identical between items when normal variations should be expected
- Document is not traceable to the items procured
- Technical data is inconsistent with code or standard requirements
- Documentation is not delivered as required on the purchase order, or is in an unusual format
- Lines on forms are bent, broken, or interrupted indicating data has been deleted or exchanged by “cut and paste”
- Handwritten entries are on the same document where there is typed or preprinted data
- Data on a single line is located at different heights
- Product recall

Fig. 1
AC Contactor



Physical Clues:

1. Terminal lug still attached
2. Screw missing
3. Mounting case bent

Fig. 2
AGISTAT Timer

Physical Clues:

1. Model number worn
2. Serial number partly worn
3. Screw heads nicked
4. Missing screw

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Circuit Breakers	Square "D" Co. (Cont'd) Component Examples		ANTI THEFT Systems Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	
	•QOB120	1 pole, 15 amp	Not Provided	SENS ID #10,3-17-89
	•QO220 •LO-3 •SBW-12 •989316	2 & 3 pole-20 & 50 amp breakers	General Circuit Breaker & Electrical Supply HLC Electric Supply	NRC I.N. 89-45 & Supple. #2
	•FAL3650-16M or FAL36050-16M •KA36200	3-pole-200 amp breaker 30A/600V	California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale	
	•999330		ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	
	Manufacturer not provided •EHB3025	Not Provided	Stokely Enterprises	DOE Letter 8-26-91 Reprinted "NuVEP: Bulletin 7-26-91
Circuit Breakers	Fed. Pacific (Component Examples)		General Circuit Breaker & Electrical Supply	SENS ID. #10 3-17-89
	•NEF431020R •NE111020 •NE	3 pole, 20 amp 1 pole, 20 amp 1 pole, 15 amp	HLC Electric Supply, California Breakers, Inc.,	SENS ID. #11 3-3-89
	•NF63-1100 •NE22-4060 •NE22-4100 •NEF-433030	1, & 3 pole- 30, 60 & 100 amp breakers	PENCON International (DBA) General Magnetics/ Electric Wholesale,	NRC I.N. 88-46, Supp. & Attach.
	•2P125		ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Circuit Breakers	ITE (Con'd) (Component Examples) •E42B020 •QJ2B200 •JL3B400 •HE9B040 •EE3B050 •BQ2B030 •EE3B070 •EE2B100 •EE2B050 •EE2B030 •FJ3B225 •ET •KA •EH-313015 •JL-3B070 •JL-3B150 •E43B015 •EF2-B030 •EH3B100 •QP1B020 •QJ3B200 •EF3B100 •1193		California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	
Circuit Breakers	ITE, Gould & ITE Imperial Brown Boveri Elect. (BBE) ASEA Brown Boveri (Component Examples) •Type HK 5 HK 7.5 HK 1 5 HK 38 HK •ITE 62-6	 Not Provided ID 4-KV Not Provided Not Provided Not Provided	 Brown Bover ASEA Brown Boveri	 NRC I.N. 89-86 NRC I.N. 87-41 Office of Nuc. Safety 92-25
Circuit Breakers	Square "D" Co. Component Examples •KHL 36125 (Any Type)	Molded case	General Circuit Breaker & Electrical Supply HLC Electric Supply, California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale	NRC I.N. 88-46, Supp. & Attach. NRCB 88-10 NCR I.N. 90-46

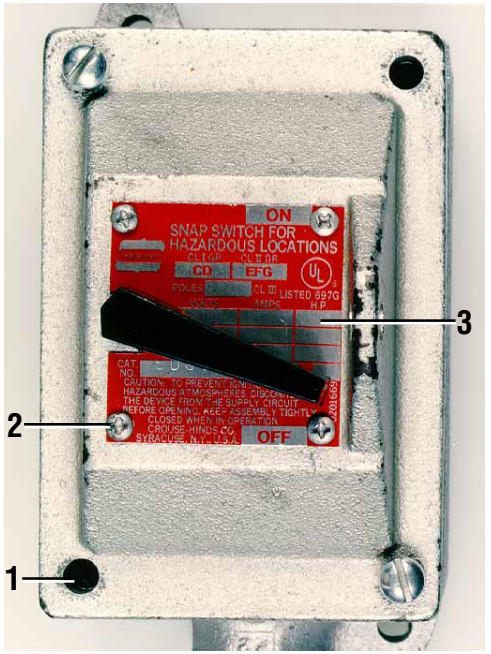


Fig. 3
Explosion Proof Switch (Outside View)

Physical Clues:
1. Screw missing
2. Face plate screwed on - normally riveted
3. Face plate not marked with voltage, amps, HP

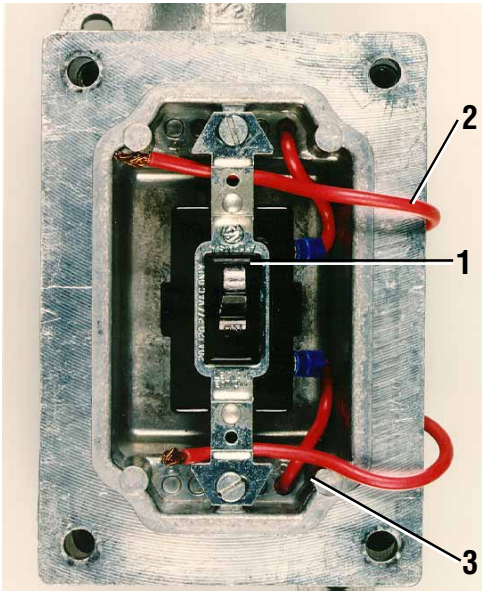


Fig. 4
Explosion Proof Switch (Inside View)

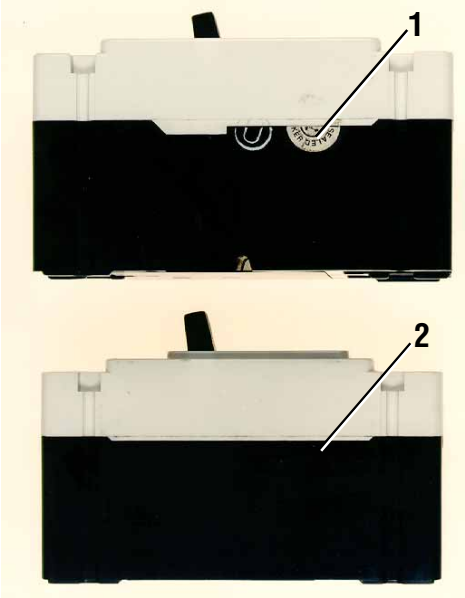
Physical Clues:
1. Normal light duty switch
2. Short wire length
3. Sealant material old or missing

Fig. 5
Large Breaker
(Top View)

Physical Clues:

1. Amperage on toggle switch should be hot-stamped
2. Amperage on toggle-switch worn or removed
3. No epoxy filler material in screw heads on front

Fig. 6
Large Breaker
(Side view)



Physical Clues:

1. Factory seal broken, partially missing, or mismatched
2. No factory seal on side

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Circuit Breakers	Westinghouse (Cont.) (Component Examples)			
	•FA-2050			
	•HFB-3050			
	•JA-2225			
	•HLM3800T			
	•F3100N			
	•MA3500			
	•EH2015			
	•LA3200WL			
	•HLA3200T			
	•2602D58U9			
	•HLB3200T			
	•2602156G19			
	•EHB2100			
	•1A & 1B			
	•HL3800T			
	•MDL#KAF	225 amp., 3 pole	Not Provided	SENS ID. #10 3-17-89
	•QNB3020	3 pole, 20 amp.		
	•QNB3030	3 pole, 30 amp.		SENS ID. #11 3-3-89
	•BA	1 pole, 20 & 30 amp.		
	•BA	2 pole, 20 & 30 amp.		
	•E3060	3 pole, 60 amp.		
	•F3020	3 pole 20 amp.	Not Provided	SENS Report ID #12 10-19-88 NRC I.N. 88-46
Circuit Breakers	ITE (Component Examples)			
	•Model - E43B015	3-phase 480 volt	Cal. Breakers/Elect. Wholesale Supply Co	SENS Report ID #8, 5-5-89
	•EQ-B	1 pole, 20 amp.	Not Provided	SENS ID #10, 3-17-89
	•EE-3B030	3 pole, 30 amp.		SENS ID #11, 3-3-89
	•EF3B070	2 & 3 pole, various amperages	General Circuit Breaker & Electrical Supply	NRC I.N. 88-46, Supplements and Attachments
	•EF3H050			
	•EF3B125			
	•EF3B040		HLC Electrical Supply	

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Circuit Breakers	Westinghouse (Cont.) (Component Examples) •225N •EB 1020 •HDEA 2030 •MCP331000R •MCP431550CR •BAB3060H •656D14 8G03 •FA-2100 •EH-2050 •HFB-3050 •HFD(B)-3020 •MA3600 •F2020 •EH2100 •EB3050 •HMC3800F •EA2090 •FA3125 •HMCP 150 •HFD		ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	
Circuit Breakers	Westinghouse (Cont.) (Component Examples) •EH2070 •JB3100 •EB2030 •8MC800 •CAH3200 •EHB3040 •JL3-B150 •JL3-B200 •JL3-B090 •JL3-B1000 •HFA, HFB, FA •JL3-(B)8070 •JL3-B125 •EH-2020 •FA-3035 •EH-2050 •FA-2100	Shunt Trips Aux. Contacts 2 & 3 pole circuit breakers of various amperages	General Circuit Breaker & Electrical Supply HLC Electrical Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker - Electrical Supply	NRC I.N. 88046, Supplements and Attachments

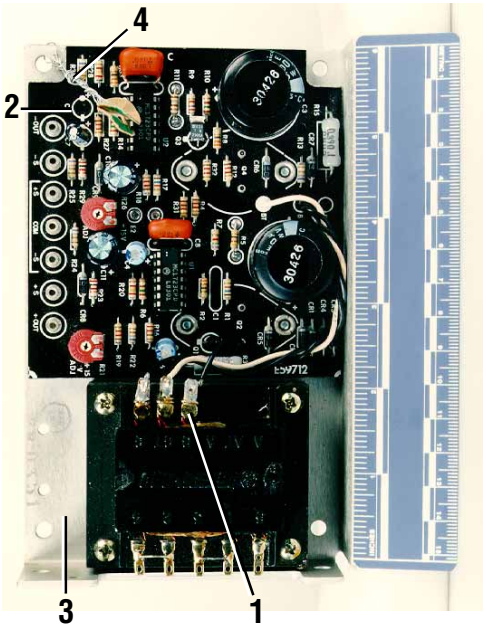


Fig. 7
Power Supply
(Inside View)

Physical Clues:

1. Cold solder joint
2. Missing capacitor
3. Information partially rubbed off
4. Remainder of sample tag and wire still attached

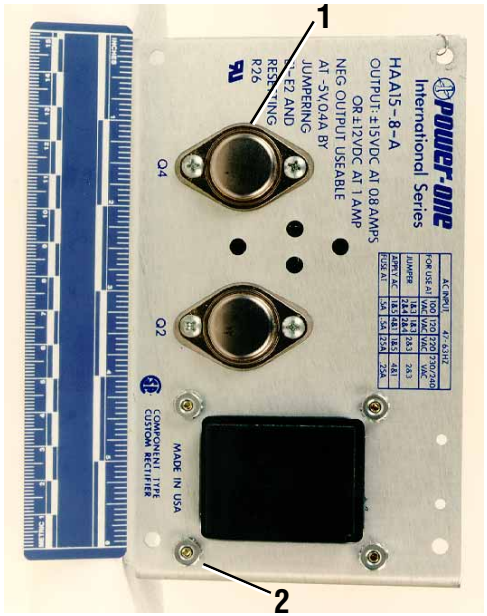


Fig. 8
Power Supply
(Top View)

Physical Clues:

1. Part numbers worn on transistors
2. Transformer mounting bolts typically have heads exposed and nuts on inside

Fig. 9
UEC Pressure Switch

Physical Clues:

1. Model or type worn or removed
2. Wrench marks on long stem
3. Protruding gasket material

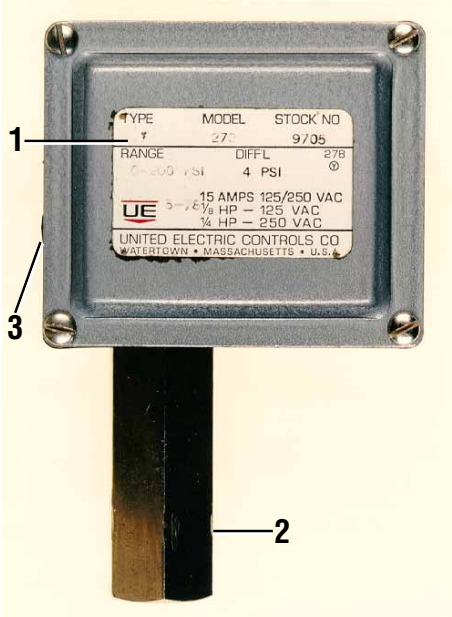
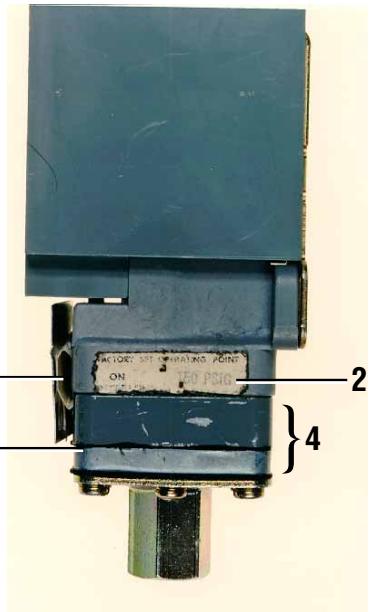


Fig. 10
Square D Pressure Switch

Physical Clues:

1. Label taped on
2. Label on side worn, should be other side
3. Gasket material rough
4. Different color of components; appears to have been taken apart or changed



COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Circuit Breakers	General Electric (Component Examples) •THEF136M1100 •TED 134030-WL •AK2A25 •THED-136100-WL •THED-136050-WL •THED-136045-WL •THFK-236070-WL •TE-122070 •THED-136150-WL •THED-13600-WL •TED-113020 •TEC-36050 •THED-124015-WL •TFI 36090 •TF 361050-WL •AK-3A-25 •TDQ-32150			Office of Nuclear Safety 93-5 (#11)
Circuit Breakers	Westinghouse (Component Examples)			
	Not Provided	Commercial Grade	Westinghouse Electric Supply Co. (WESCO)	NRC I.N. 91-48
	•DB-25 & DS-416	Low voltage	Satin America & Circuit Breaker Systems, Inc.	NRC I.N. 89-45 & Supple. #2
	•FSN-5925-628-0641 •DB-25 •DB-50 •HKB3150T •FB3020 •FB3070 •FB3050 •EHB3025 •LBB3125 •HKA31250 •JA3200 •EHB2100	Trip units; Navy trip units; 1, 2, & 3 pole various amp. ratings.	General Circuit Breaker & Electrical Supply HLC Electrical Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale	NRC I.N. 88-46, Supplements and Attachments Office of Nuc. Safety 93-9

APPENDIX B

Extracted from Lockheed Idaho Technologies Company's
Internal Report INEL-95/227,
"Guidelines for Identifying Suspect/Counterfeit Material," September 1995.

SUSPECT COMPONENT LIST

COMPONENT	MANUFACTURER / TYPE	DESCRIPTION	SUPPLIER	REFERENCES
Channel Members	Unistrut Corp.	Continuously slotted channels, structural framing members, fasteners, nuts, fittings, pipe clamps	Unistrut Corp.	NRC I.N. 91-25
Circuit Breakers	General Electric (Component Examples) •AKF-2-25 •EC Trip Types •AK(All Types)	Metal Clad, low voltage, DC	Satin America & Circuit Breaker Systems, Inc.	NRC I.N. 89-45, Supplements and Attachments SENS Report ID #6 5-23-89
	General Electric (Component Examples) •KHL 36 125 •THEF 136050 •AK-2-75-3 •AK-2 •AK-1-50 •AK-1-75 •B •TDQ •TCVVFS •TFJ •TEB122015-WL •TEB132090-WL •TE111015 •TED134060-WL •TEB122050-WL •THED136100 WL •TED126050 •THED136060 WL•THGB2120 •TEF134015	1, 2, & 3 pole various amperages	Bud Ferguson's Industrial Control & Supply Inc. General Circuit Breaker & Electrical Supply HLC Electric Supply California Breakers, Inc. PENCON International (DBA) General Magnetics/ Electric Wholesale ANTI THEFT Systems, Inc. (DBA) ATS Circuit Breakers and AC Circuit Breaker-Electrical Supply	NRC I.N. 88-46, Supplements and Attachments NRC I.N. 90-46

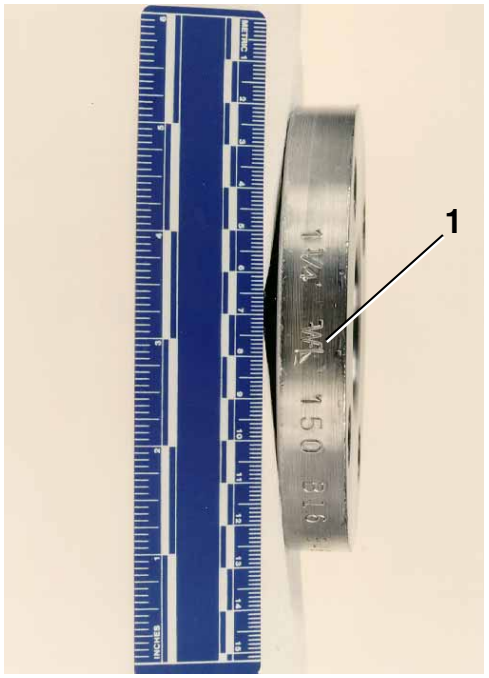


Fig. 11
Small Flange

Physical Clues:
1. Product identification "WL" altered

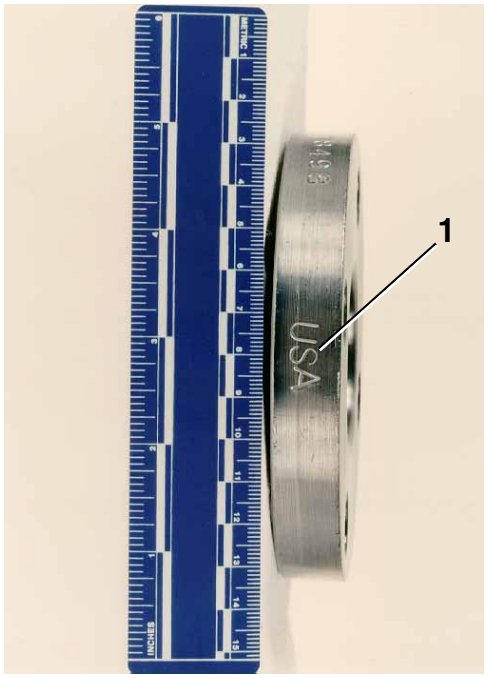
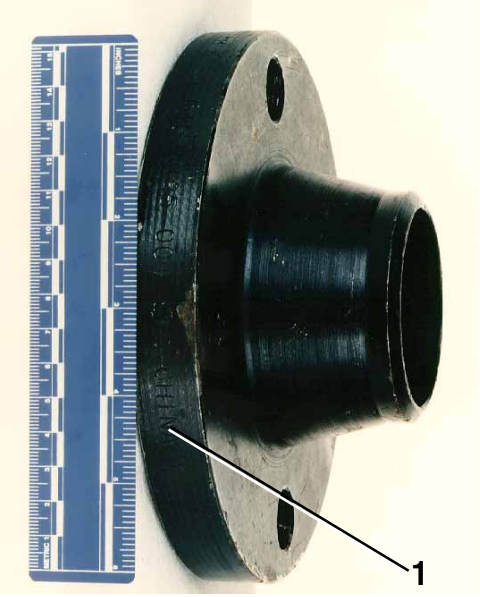


Fig. 12
Small Flange

Physical Clues:
1. USA added; non-uniform stenciling

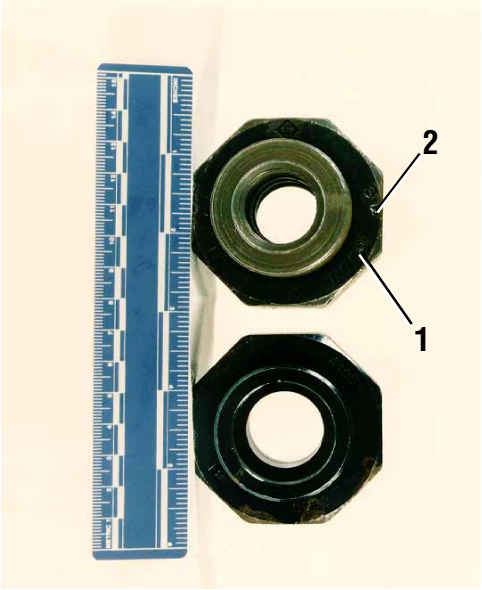
Fig. 13
China Flange



Physical Clues:

1. Appears good; however, DOE Notice indicates china flanges are to be considered suspect

Fig. 14
High Pressure Union



Physical Clues:

1. Pressure rating altered
2. Original size marking of 1" changed to 3/4" by stamping 3 and 4 on either side of 1" marking

BNL S/CI Evaluation Form
(page 2)

ES&H EVALUATION OF INSTALLED SUSPECT/COUNTERFEIT ITEMS (S/CI) 9/97

5.0 EVALUATION OF ES&H IMPACT DUE TO FAILURE OF S/C ITEM:
The following section to be completed jointly by engineering and safety personnel. A "Yes" entry on any of the following criteria identifies the system or component as **"Critical"**, ie. its' failure would have adverse impact on ES&H. All "No's" identifies the system or component as **"Non-Critical"**. Installed S/C Items may be evaluated on a "systems" basis, i.e., water system, vacuum system, etc.

5.1 Does the system, structure or component containing the S/CI meet the BNL QA Manual classification A1 or A2? (Coordinate with your local Quality Rep for additional guidance). [ ] Yes [ ] No

5.2 Based on ES&H Standard 1.3.3 Hazard Severity Category I, II or III criteria, would failure of the S/CI result in :
a) More than 4 days programmatic downtime; [ ] Yes [ ] No
b) A dollar loss of more than $50,000; [ ] Yes [ ] No
c) Any injury or illness to workers or general public; [ ] Yes [ ] No
d) Radiation/chemical releases exceeding the limits shown in Hazard Severity Category III. [ ] Yes [ ] No

5.3 Are the suspect items/materials located in:

a) The load bearing path of the crane, hoist, or elevator; [ ] Yes [ ] No
b) Vehicle (including material handling equipment, i.e forklifts) engines, or components used to attach brakes, or steering mechanisms. [ ] Yes [ ] No

6.0 SUSPECT ITEMS LEFT IN PLACE

The following justification must be provided for Suspect Items left in place. Appropriate supporting documentation (eg. engineering calculations, pictures, drawings, memos, etc.) to be attached.

*NOTE: The following signatures required:
a) **Critical** Systems/Components signatures for 1, 2, & 3
b) **Non Critical** Systems/Components signatures for 1& 2

Location: _____ Id. Method: _____ Qty: _____
Justification: _____
_____
_____
_____
_____

*1) Engineering Review (sign/print) _____ date _____
*2) ESH Coordinator (sign/print) _____ date _____
*3) Dept./Div. Head (sign/print) _____ date _____

7.0 S/CI DISPOSAL: Item removal shall be coordinated with area Supervisor, Quality and Safety Representative. Removed items are to be segregated and held by the Quality or Safety Representative pending disposal. Quality Management Office should also be contacted.

Removed Suspect item given to _____
Signed _____ date _____
Title _____ Organization _____

APPENDIX A

BNL S/CI Evaluation Form
(page 1)

ES&H EVALUATION OF INSTALLED SUSPECT/COUNTERFEIT ITEMS (S/CI) 9/97

1.0 **POLICY**: Any installed suspect/counterfeit item (S/CI) is to be evaluated by both engineering & safety personnel to determine the potential impact of item failure on the environment, safety and health (ES&H) of workers and the public. Based on the evaluation appropriate action will be taken. Items determined to have an adverse impact on ES&H **shall** be replaced at the earliest possible opportunity.

REPORTING: All S/C items found must be reported in the "Occurrence Reporting System". (Contact your local Quality and Safety Representative for details.)

S/C Item Identification Replacement: Suspect items left in place are to be identified (painted, marked, documented, etc.) so they can be identified in the future. These items should be replaced at the next maintenance cycle to avoid item migration. Removal of S/CI from Critical Systems/Components should be the first order of priority.

Critical Systems/Components: Those systems or components whose failure would have an adverse impact on ES&H are considered to be **"Critical"** (see 5.0). S/CI(s) left in place in critical systems/components **MUST** be justified in writing below, reviewed and signed by senior management (e.g. Dept./Div. Head).

- ES&H Impact - S/CI(s) found whose failure could have an adverse impact on ES&H of workers or the public (see 5.0) **MUST** be removed at the earliest possible opportunity. If appropriate, systems should be "locked out/tagged out".
- Programmatic Impact - S/C Items found in critical systems, components or structures whose failure could pose **ONLY** a programmatic impact (e.g. Non ES&H, see 5.0) may be left in place (see Section 6.0).

Non Critical Systems/Components: S/C Item(s) found in **non** critical systems or components may be removed or left in place at the discretion of Dept./Div. management. Justification for this action need only be reviewed and signed by engineering and safety personnel.

2.0 SUMMARY EVALUATION & CORRECTIVE ACTION: This section to be completed last.

Sys./Comp w. S/CI: [ ] Critical [ ] Non-Critical; ES&H Impact [ ] Y [ ] N; Program Impact [ ] Y [ ] N;
S/CI Removed [ ] Y [ ] N; (Justification required for items left in place, see 6.0)
Planned S/CI Removal: @ Next Maintenance/Repair [ ] Y [ ] N; @ Facility Decommision [ ] Y [ ] N
Target S/CI Removal Date: _____; Actual Removal Date _____

3.0 S/CI ITEM LOCATION INFORMATION:

LOCATION: Bldg. _____, Parent Facility _____, (NSLS, AGS, HFBR, BMRR, RD, ETC.)
Location in Bldg./facility: _____
_____
_____

TYPE: [ ] Grade 5 Bolt Qty. _____ [ ] Grade 8 Bolt Qty. _____
[ ] Piping Component _____ Qty. _____ [ ] Electrical Component _____ Qty. _____
[ ] Other _____

DESCRIPTION: S/CI manufacturer & Mod. #, headmarking, etc. _____
_____
_____

SYSTEM DESCRIPTION: System Name ID _____
[ ] structural [ ] vacuum [ ]electric [ ] Fluid; Pressure ____ psi. Temp. ____ F/C [ ] other _____
System Contents - [ ] gas _____ [ ] water [ ] steam [ ] other _____

4.0 SUSPECT/COUNTERFEIT ITEM REPLACEMENT WITHOUT ES&H IMPACT EVALUATION
Item(s) were replaced without completing evaluation section [ ] Yes-Go to 7.0 [ ] No

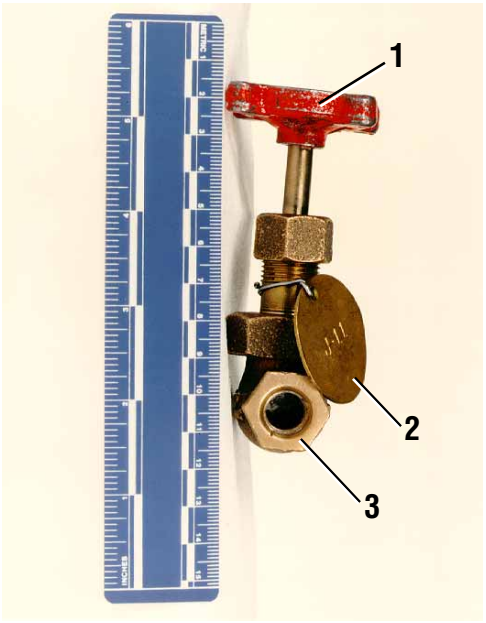


Fig. 15
Globe Valve, 1/4"

Physical Clues:
1. Paint on handle worn off
2. Brass tag attached
3. Foreign material in valve

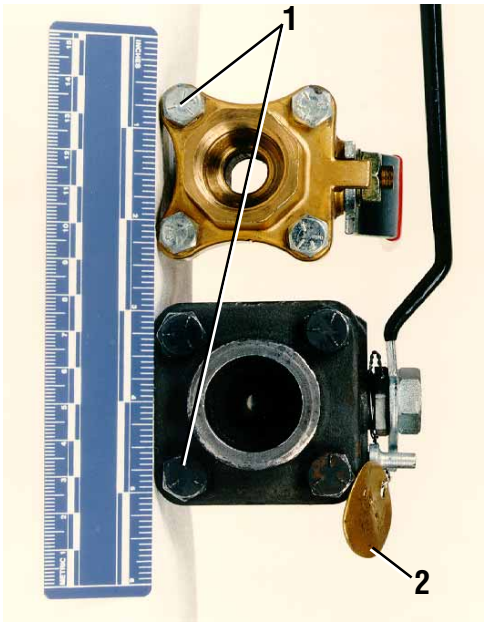


Fig.16
Ball Valve, 3/4"

Physical Clues:
1. Suspect/counterfeit fasteners
2. Brass tag attached

Mechanical Items

Fasteners - The following typical S/CI attributes have been compiled from experience:

- head markings are marred, missing, or appear to have been altered
- head markings are inconsistent within a heat lot
- head markings appear to be impression-stamped from post production (typically, raised head markings are added during the forging process.)
- threads show evidence of dressing or wear (threads should be uniform in color and finish)

Torquing of Fasteners

Proper torquing of different grade fasteners is critical for the safe operation of the crane. Comparison values are shown in the chart below. The values listed are suggested maximums on parts carrying residual oil of manufacture; they do not apply to plated parts or parts otherwise lubricated.

Recommended Torque Values		Source: P&H Crane Company	
Screw Diameter & Threads/in.	SAE Grade 2 P&H Standard No Head Marking (ft. lbs.)	SAE Grade 5 P&H Hi-Tensil (ft. lbs.)	SAE Grade 8 (ft. lbs.)
1/4-20	5	8	12
5/16-18	11	17	24
3/8-16	18	31	44
7/16-14	28	49	70
1/2-13	39	100	125
5/8-11	88	200	250
3/4-10	105	350	440
7/8-9	160	570	720
1-8	235	850	1070
1-1/8-7	300	1050	1500
1-1/4-7	420	1480	2120
1-3/8-6	560	1950	2780
1-1/2-6	740	2580	3710

Mobile Cranes

- All brakes and clutches.
- Load hoisting and lowering mechanisms.
- Boom hoisting and lowering mechanisms.
- Swing mechanism.
- Travel mechanism.
- Safety devices.

Forklift

- Static-test load should be in accordance with the manufacturers recommendations. A maximum load drift shall be allowed of three inches vertically and one inch horizontally at the forklift's hydraulic cylinder during the ten-minute static-load test interval.

Structural Bolting

S/CI and crane safety are closely related. Both fixed and mobile cranes have many bolted connections that, by design, rely on the integrity of the fasteners to meet the design-and safety-specifications for safe operation.

The Crane Manufacturer's Association of America (CMAA), in its CMAA Specification #70 (rev. 1994) discusses structural bolting. Joints designed as high-strength bolted connections are to conform to the requirements of the Specification for Structural Joints Using ASTM A325 or A490 Bolts. (http://www.astm.org)

The following points also should be observed whenever dealing with bolted fasteners. A check should be made with the equipment's manufacturer to identify bolting requirements, precautions and reccommendations.

- Never reuse nuts or bolts that have been heated with a torch during removal.
- Never mix different grades and sizes of nuts and bolts.
- Store all nuts and bolts indoors.
- Inspect all nuts and bolts for signs of corrosion, wear, and damage before installation.
- Clean and lubricate all nuts and bolts.
- Use only hardened steel washers.
- Check for bolt protrusion (all threads on the nut should be engaged by the bolt).
- Never retorque a loose nut or bolt. If it was tight initially and has loosened, then it has either stretched or stripped its threads. Install new nuts and bolts.

Suspect Head Mark List

Note: A graphic of the following bolt head marking information has been created. When printed, laminated and punched, it creates a 2 1/4˝ x 3 1/4˝ card. This card provides a ready reference of identified suspect bolts and can be carried on an ID badge chain or strap. The graphic is available from the DOE Suspect/Counterfeit Items Home Page (http://www.fm.doe.gov/SCI/).

ALL GRADE 5 AND GRADE 8 FASTENERS OF FOREIGN ORIGIN WHICH DO NOT BEAR ANY MANUFACTURERS' HEADMARKS:


Grade 5


Grade 8

GRADE 5 FASTENERS WITH THE FOLLOWING MANUFACTURERS' HEADMARKS:

MARK	MANUFACTURER	MARK	MANUFACTURER
J	Jinn Her (TW)	KS	Kosaka Kogyo (JP)

GRADE 8 FASTENERS WITH THE FOLLOWING MANUFACTURERS' HEADMARKS:

MARK	MANUFACTURER	MARK	MANUFACTURER
A	Asahi Mfg (JP)	KS	Kosaka Kogyo (JP)
NF	Nippon Fasteners (JP)	RT	Takai Ltd (JP)
H	Hinomoto Metal (JP)	FM	Fastener Co of Japan (JP)
M	Minamida Sleybo (JP)	KY	Kyoei Mfg (JP)
MS	Minato Kogyo (JP)	J	Jinn Her (TW)
E	Daiei (JP)	UNY	Unytite (JP)
Hollow Triangle	Infasco (CA TW JP YU) (Greater than 1/2 inch dia.)		

GRADE 8.2 FASTENERS WITH THE FOLLOWING HEADMARKS:

MARK	MANUFACTURER
KS	Kosaka Kogyo (JP)

GRADE A325 FASTENERS (BENNETT DENVER TARGET ONLY) WITH THE FOLLOWING HEADMARKS:

	MARK	MANUFACTURER
Type 1	A325 KS	Kosaka Kogyo (JP)
Type 2		
Type 3		

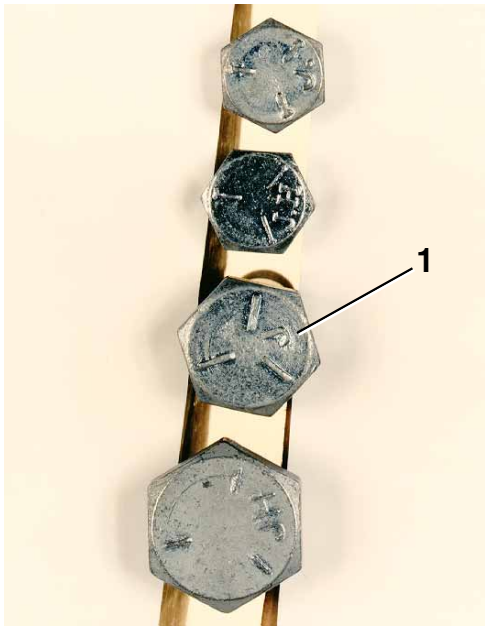


Fig. 17
Fasteners

Physical Clues:

1. The Grade 5 with the "j" headmark is the only one that is suspect/counterfeit. All the fasteners were manufactured by Jinn Her

Fig. 18
UNISTRUT

Physical Clues:

1. Weld too light

Testing

Fastener Testing - Proves that the fastener tested is acceptable or unacceptable. When the fastener tested can be traced to a specific heat lot, then those fasteners from the same heat lot are acceptable or unacceptable. Most physical and chemical tests performed on fasteners are destructive; however, surface hardness tests are not.

Crane Testing - Proves that any work (maintenance/repair) carried out on the crane or machine has been done correctly and the equipment can perform safely and reliably within its intended scope. The following is taken from the DOE's Hoisting Manual, Overhead and Gantry Cranes, and applies to all cranes or machines to demonstrate that the components listed below operate properly.

Brakes - "Brakes shall work satisfactorily and load brakes shall be able to hold any load up to at least 125% of the rated stable capacity of the equipment, without slipping or overheating" (DOE Hoisting Manual, Section 7.1).

Load Tests - Crane load-testing verifies that the crane components will reliably lift, transport, and hold the load safely. This load-testing is not designed to prove whether a suspect/counterfeit bolt is acceptable or whether it will function adequately. Only tests of the fastener will prove that (see above). Therefore, crane load-testing is not an acceptable method to test bolts in cranes or forklifts - nor is reducing the operating-load capacity a safe technique for addressing this problem. For mobile cranes, "load tests are not to exceed 100% of the special-rated capacity of the crane" (DOE Hoisting Manual, Section 7.2.2.b [3]).

Lifting Equipment Tests -

The following summarizes typical tests performed on lifting equipment to verify proper operation. A check should be made with manufacturer of equipment to identify all necessary tests.

Overhead and Gantry Cranes

- Load hoisting and lowering mechanisms.
- Transport load with trolley for full length of bridge.
- Transport load with the bridge for the full length of the runway, in one direction with the trolley as close to the extreme right-hand end of the crane as practical, and in the other direction with the trolley as close to the extreme left-hand end of the crane as practical.
- Lower the load, and stopping to check the brakes.
- Determine the trip-setting of hoist-limit devices, with an empty hook traveling at increasing speeds up to the maximum. The actuating mechanism of the limit device should be located so that it will trip the device, under all conditions, in sufficient time to prevent the hook or load block contacting any part of the trolley or crane.

Corrective Action:

When suspect/counterfeit fasteners are found, they must be documented, reported, and evaluated to determine when they are to be replaced. Suspect/counterfeit fasteners that are removed must be replaced with new, approved fasteners. The appropriate supervisors and quality representatives should be involved. The "Graded Approach" should be used to prioritize the removal and replacement of the suspect/counterfeit materials.

Note: In areas where operating temperatures are 500° F and above, or where equipment is subject to cyclic loading and fatigue failure is likely to occur, all Grade 8 and 8.2 suspect/counterfeit bolts should be replaced before further use of the equipment. For more specific information, see SAE Standard J429k Appendix [33], Lifting Devices (http://www.sae.org)

The following steps should be taken to control discovered S/CIs in lifting equipment:

1. Document and report discovery of S/CI via Occurrence Reporting System (ORPS) and to the local Office of Inspector General (OIG).

2. Determine critical load paths by conducting an engineering evaluation on the basis of information provided by the equipment's manufacturer.

3. Based on the S/CI's location take the following action:

   Critical Load Path - S/CI discovered in a critical load path could create a safety hazard.
   - Shut down equipment, notify site-or facility-management and lock out and tag out or otherwise remove equipment from service according to site procedures
   - Replace S/CI with known acceptable item.

   Non-Critical Load Path - S/CI discovered outside the critical load path may be removed or left in place if the following actions are taken:
   - Mark items to readily identify them for replacement when their removal is required for maintenance or repair
   - Prepare corrective action plan, identifying when items will be replaced (i.e., replace the suspect/counterfeit item during an outage or planned maintenance schedule).

4. Dispose of suspect/counterfeit item in accordance with the DOE Quality Alert Bulletin, and generate final occurrence report.

5. Load-test lifting equipment before use according to the requirements specified by the manufacturer or a national consensus standard.

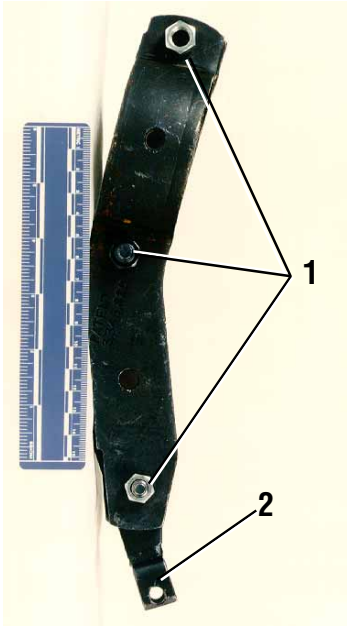


Fig.19a
Pipe Clamp

Physical Clues:
1. Different nuts used on bolts
2. Mounting attachment questionable, holes oblong

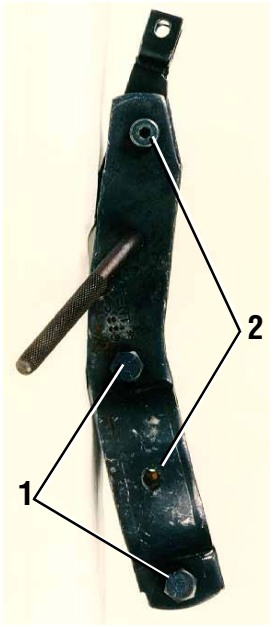


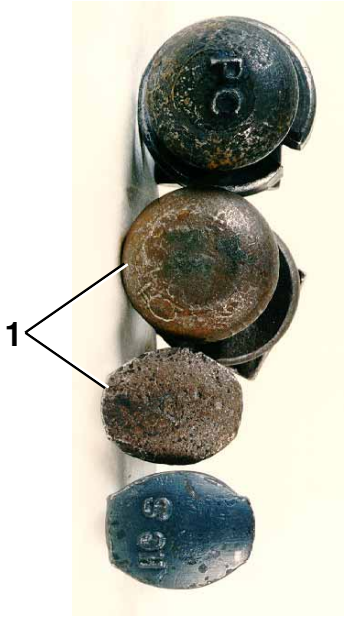
Fig.19b
Pipe Clamp

Physical Clues:
1. Suspect/counterfeit fasteners
2. Different types of fasteners

Fig. 20
Railroad Carriage

Physical Clues:

1. No manufacturer's headmark, which is now required.



Forklifts

- Lifting mechanisms
- Roll bars or cage to protect operator

Mobile Cranes

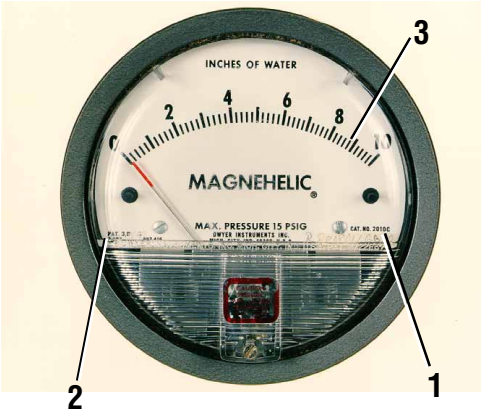
- Top and bottom block
- Revolving frame mountings
- Outrigger mechanisms
- Bolted connections on boom structure
- Cable clamps
- Ropes
- Rigging and lifting devices

Miscellaneous Items

Rotating Machinery and Valve Internal Parts - The following typical S/CI attributes have been compiled from experience:

- show marring, tool impressions, wear marks, traces of Prussian blue or lapping compound, or other evidence of previous attempts at fit-up or assembly
- have evidence of heat discoloration
- have evidence of erosion, corrosion, wire-drawing, or “dimples” (inverted cone-shaped impressions) on valve discs, seats, or pump impeller

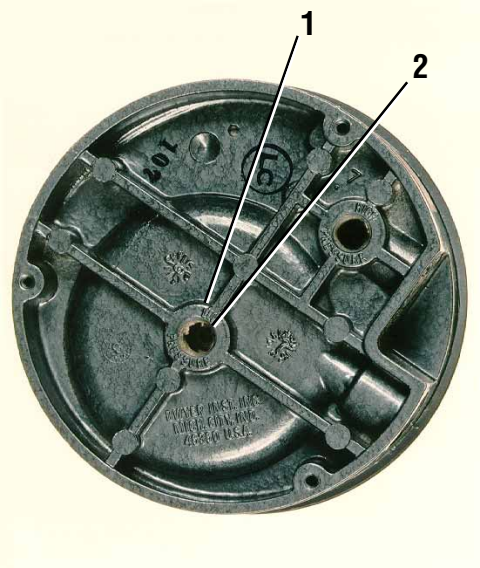
Fig. 21
Magnehelic Gauge
(Front View)



Physical Clues

1. Handwriting on front face
2. Patent number scratched out
3. Receiving paperwork indicates gauge reading of 0 to .5, actual gauge indicates 0 to 10

Fig. 22
Magnehelic Gauge
(Back View)

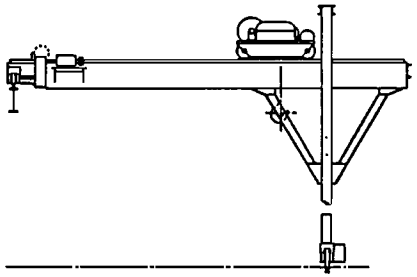


Physical Clues:

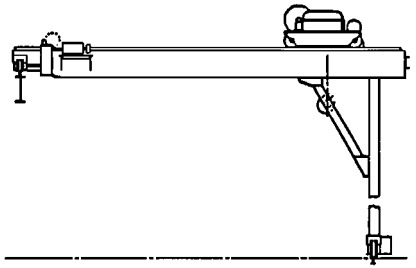
1. No plastic protection caps in inlet and outlet ports
2. Pipe dope in threads

Gantry Cranes

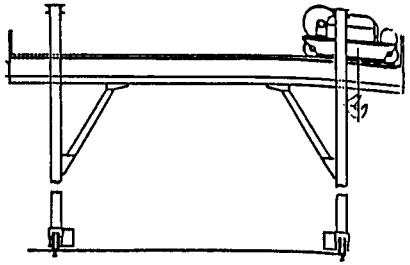
- Bolted connections joining structure together
- Blocking and hoisting mechanism
- Trolley stops
- Bolted rail connections
- Ropes
- Rigging and lifting devices



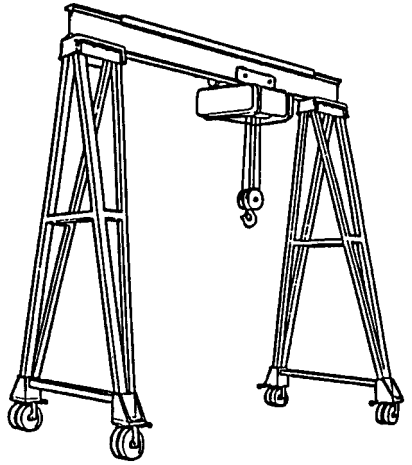
Single through- Leg



Single-leg gantry crane



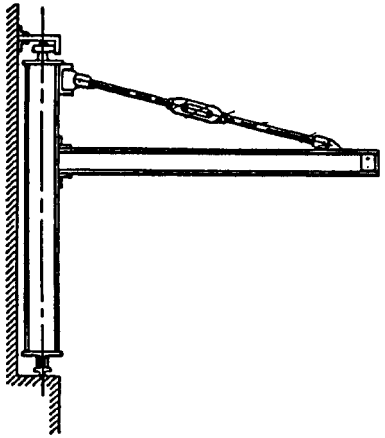
Double-leg gantry crane



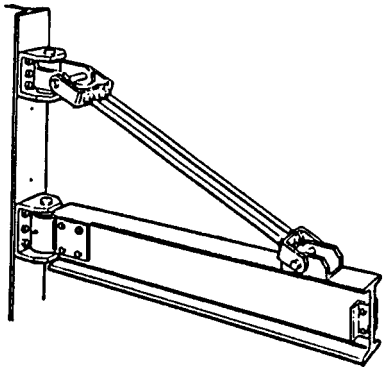
Lightweight movable gantry crane

Jib Cranes

- Base-plate connection to floor
- Bolted connections joining structure together
- Bolted connections joining crane to permanent structure
- Block and hoisting mechanism
- Trolley stops
- Ropes
- Rigging and lifting devices



Wall-traveling jib



Wall-bracket jib

Fig. 23a
Rupture Disc

Acceptable

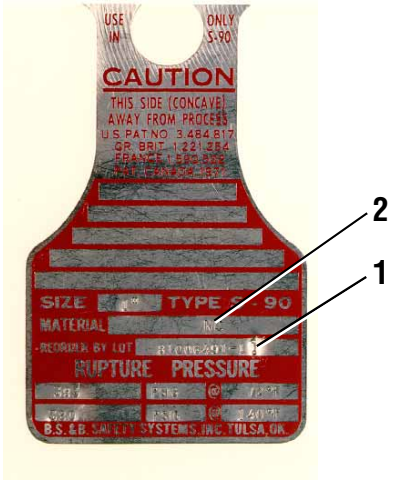


Fig. 23b
Suspect/Counterfeit

Physical Clues:

1. Lot number altered, an additional number added
2. Material designation changed, a letter added

Lifting Equipment

General

Lifting equipment, including fixed and mobile cranes and other devices, such as forklifts, scissor lifts, balers, truck and dock lifts, and slings, have many bolted connections designed to rely on the integrity of the fasteners to meet specified design-safety factors for safe operation. Therefore, the safe operation of these devices can be improved by removing known S/CIs and replacing them with good materials, thus ensuring the safety of the workers and avoiding damage to equipment that might otherwise become involved in an accident.

Equipment Inspection

Cranes, hoists, and forklifts onsite (including the equipment of the facility, contractors, and subcontractors) should be inspected for known, identified suspect/counterfeit fasteners. Particular attention should be paid to the "critical load path".

Critical Load Path

The "critical load path" includes "...any materials or structure that will be part of or affected by the load being picked or moved". Lifting equipment manufacturers have identified the "critical load path" and key structural components for their equipment.

The manufacturers' information should be checked for details of the specific "critical load path" of the equipment you are working with. The typical critical load path and/or key structural connections for various cranes and lifting devices follow:

Overhead Cranes

- Bottom and top lock
- Trolley mechanism-including hoist brake, hoist drum, cable locks, and other items that, upon failure, could cause a load to fall unchecked or create a safety hazard for the operator or pesonnel working nearby
- Bolted connections on main bridge supports
- Bridge-end trucks
- Bolted rail connections
- End stops
- Cab assembly mounting bolts affecting worker's safety
- Ropes

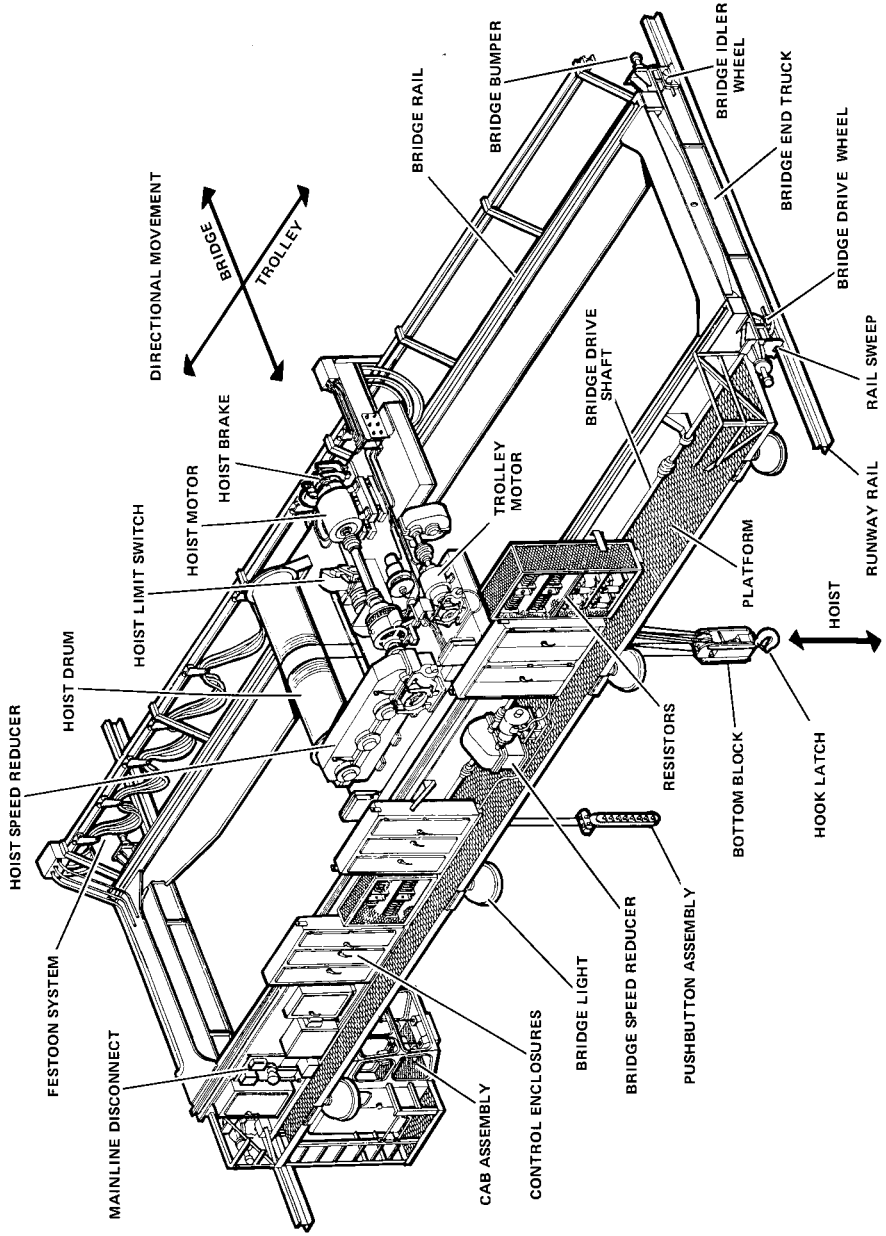


Figure 1. Bridge Crane